15.3B: Target Cell Specificity

Hormones target a limited number of cells (based on the presence of a specific receptor) as they circulate in the bloodstream.

Learning Objectives

- Describe target cell specificity in the endocrine system

Key Points

- Target cells are cells that are receptive to a secreted hormone.
- Target cell activation is dependent on three factors; the hormone levels in the blood, the receptor levels on the target cell, and hormone–receptor affinity.

Key Terms

- **target cell**: A cell that is receptive to a secreted hormone.

EXAMPLES

An XY fetus will develop along a female pathway if the target cells fail to respond to androgen. This androgen insensitivity occurs when the receptors on the target cells are unable to accept the hormone due to an impairment in
receptor shape.

In endocrinology, target cells can refer to the cells where hormones have an effect. Target cells are capable of responding to hormones because they display receptors to which the circulating hormone can bind. In this way, hormones only affect a limited number of cells even though they are transported in the bloodstream throughout the body.

Target cell activation is dependent on three factors:

1. The levels of hormone in the blood.
2. The relative number of hormone receptors on the target cell.
3. The hormone–receptor affinity.

Modulation of these factors can control target cell response. For example, after receptor stimulation the signaling target cell often sends feedback to the hormone-secreting tissue to down-regulate hormone expression.

Additionally, the target cell can up or down-regulate receptor expression to make it more or less sensitive to the same hormone. Finally, hormone–receptor affinity can be altered by the expression of associated inhibitory or co-activating factors.

In some instances, alterations of receptor structure due to a genetic mutation can lead to a reduction in hormone–receptor affinity, as in the case of androgen insensitivity.